

We claim:

- 1) A device for inspecting and classifying a plurality of microscopic crystals, comprising:
  - A) at least one camera,
  - B) an indexing device for sequentially placing said microscopic crystals in camera-view of said at least one camera, and
  - C) at least one computer programmed to control said indexing device and said at least one camera, wherein said at least one computer is programmed to receive from said at least one camera images of said plurality of microscopic crystals, wherein said at least one computer is programmed to classify said plurality of microscopic crystals.
- 2) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, further comprising a computer monitor, wherein an operator interfacing with said at least one computer manually inputs a score to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.
- 3) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein said at least one computer automatically classifies said plurality of microscopic crystals after receiving said images.
- 4) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view, wherein said second camera comprises a motorized zoom lens controllable by said at least one computer.
- 5) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein each of said plurality of microscopic crystals are contained within a

drop of liquid, wherein each drop of liquid is contained within a well of a micro-well plate.

- 6) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein said plurality of microscopic crystals are a plurality of protein crystals inside the wells of at least one micro-well plate.
- 7) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein said indexing device comprises:
  - A. a first linear actuator for horizontally positioning said positioning station,
  - B. a second linear actuator for horizontally positioning said at least one camera, and
  - C. a third linear actuator for vertically positioning said at least one camera.
- 8) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 7, wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view, wherein said second camera comprises a motorized zoom lens controllable by said at least one computer.
- 9) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, further comprising a bar-code reader and a micro-well plate sensing device.
- 10) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein said at least one computer comprises a frame grabber for receiving images of said plurality of microscopic crystals from said at least one camera.
- 11) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 1, wherein said at least one computer is connected to a computer network.

12) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 11, wherein said at least one computer network is the Ethernet.

13) A method for inspecting and classifying a plurality of microscopic crystals, comprising the steps of:

A) sequentially placing said plurality of microscopic crystals in camera-view of at least one camera utilizing an indexing device,

B) taking the images of said plurality of microscopic crystals with said at least one camera,

C) transferring said images to at least one computer,

D) receiving said images at said at least one computer, and

E) classifying said images at said at least one computer,

wherein said at least one computer is programmed to control said at least one indexing device and said at least one camera.

14) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said step of classifying said images at said at least one computer is done manually, wherein an operator interfacing with said at least one computer and viewing a computer monitor manually inputs into said at least one computer a score to classify said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor.

15) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said step of classifying said images at said at least one computer is done automatically at said at least one computer after receiving said images at said at least one computer.

16) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view,

wherein said second camera comprises a motorized zoom lens controllable by said at least one computer.

- 17) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein each of said plurality of microscopic crystals are contained within a drop of liquid, wherein said each drop of liquid is contained within a well of a micro-well plate.
- 18) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said plurality of microscopic crystals are a plurality of protein crystals inside the wells of at least one micro-well plate.
- 19) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said indexing device comprises:
- A. a first linear actuator for horizontally positioning said positioning station,
  - B. a second linear actuator for horizontally positioning said at least one camera, and
  - C. a third linear actuator for vertically positioning said at least one camera.
- 20) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 19, wherein said at least one camera is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view, wherein said second camera comprises a motorized zoom lens controllable by said at least one computer.
- 21) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said indexing device further comprises a bar-code reader and a micro-well plate sensing device.

- 22) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said at least one computer comprises a frame grabber for receiving images of said plurality of microscopic crystals from said at least one camera.
- 23) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said at least one computer is connected to a computer network.
- 24) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 23, wherein said at least one computer network is the Ethernet.
- 25) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said images of said plurality of microscopic crystals are color images.
- 26) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 25, wherein said color images are true color images wherein said step of taking the images of said plurality of microscopic crystals comprises the sub steps of:
- A) viewing each of said plurality of microscopic crystals through a first linear polarized filter and a second colored filter, wherein the color of said second colored filter is altered between red, green and blue, to obtain a first image, a second image and a third image, and
  - B) combining said first image, said second image and said third image to obtain said true colored images.
- 27) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 25, wherein said color images are false color images wherein said step of taking the images of said plurality of microscopic crystals comprises the sub steps of viewing each of said plurality of microscopic crystals through a first linear polarized filter and a second linear polarized filter to obtain said false color images.

28) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 13, wherein said step of classifying said images at said at least one computer comprises the sub steps of:

- A) comparing said images to a database stored on said at least one computer, and
- B) assigning a classification based on said comparison.

29) The method for inspecting and classifying a plurality of microscopic crystals as in Claim 28, wherein said sub step of assigning a classification based on said comparison comprises the sub steps of:

- A) making a determination as to whether a microscopic crystal exists,
- B) making a determination as to what is present if said microscopic crystal does not exist, and
- C) making a determination as to the qualities of said microscopic crystal if said microscopic crystal does exist.

30) A device for inspecting and classifying a plurality of microscopic crystals, comprising:

- A) at least one camera means,
- B) an indexing means for sequentially placing said microscopic crystals in camera-view of said at least one camera means, and
- C) at least one computer means programmed to control said indexing means and said at least one camera means, wherein said at least one computer means is programmed to receive from said at least one camera means images of said plurality of microscopic crystals, wherein said at least one computer means is programmed to classify said plurality of microscopic crystals.

31) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, further comprising a computer monitor means, wherein an operator interfacing with said at least one computer means manually inputs a score to classify

said plurality of microscopic crystals after observing said plurality of microscopic crystals on said computer monitor means.

32) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein said at least one computer means automatically classifies said plurality of microscopic crystals after receiving said images.

33) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein said at least one camera means is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view, wherein said second camera comprises a motorized zoom lens controllable by said at least one computer means.

34) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein each of said plurality of microscopic crystals are contained within a drop of liquid, wherein each drop of liquid is contained within a well of a micro-well plate.

35) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein said plurality of microscopic crystals are a plurality of protein crystals inside the wells of at least one micro-well plate.

36) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein said indexing means comprises:

- A. a first linear actuator means for horizontally positioning said positioning station,
- B. a second linear actuator means for horizontally positioning said at least one camera means, and
- C. a third linear actuator means for vertically positioning said at least one camera means.

37) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 36, wherein said at least one camera means is a first camera and a second camera, wherein said first camera is set at a constant zoom to cover a large field of view, wherein said second camera comprises a motorized zoom lens controllable by said at least one computer means.

38) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, further comprising a bar-code reader means and a micro-well plate sensing means.

39) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein said at least one computer means comprises a frame grabber means for receiving images of said plurality of microscopic crystals from said at least one camera means.

40) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 30, wherein said at least one computer means is connected to a computer network means.

41) The device for inspecting and classifying a plurality of microscopic crystals as in Claim 40, wherein said at least one computer network means is the Ethernet.